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Canada Mines Bureau of
Explosives Division



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CANADA

Annual

report of the
**EXPLOSIVES
DIVISION**

calendar year



1960

(DEPARTMENT OF MINES AND TECHNICAL SURVEYS)



CANADA

report of the
EXPLOSIVES
DIVISION

calendar year **1960**

H. P. Kimbell
Chief Inspector



ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
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—Photo by George Lilley, Kingston, Ont.

The remains of a half-ton pickup truck following the explosion of its cargo—250 pounds of dynamite and 425 electric detonators. (Details of this accident are given on page 13)

The EXPLOSIVES DIVISION

exists solely in the interest of public safety. Its function is to administer the Explosives Act which, by a system of licences and permits supported by inspection, controls the manufacture, authorization, sale, storage, and importation of explosives, as well as the transportation of explosives by road.

offices and staff

The Division's main office is in the Mines Branch Building, 555 Booth St., Ottawa 1; branch offices are at 739 West Hastings St., Vancouver, British Columbia, and at 7 Terminal Road, Halifax, Nova Scotia.

The staff of the Division remained at sixteen—an inspectorate of six and a clerical staff of ten.

ammonium nitrate blended with fuel oil

In 1960, attention began to focus on the possibility of using ammonium nitrate-fuel oil in underground mining. As the toxic-fume properties of this explosive cannot be assessed by the usual method, its underground use must be approached with due caution. Trials were conducted at an Ontario mine with a factory-blended product and preliminary results indicated that safe operation is possible with careful precautions. Much work remains in assessing the effect of such variables as the grade of ammonium nitrate, method of loading, density of loading, strength of booster, and moisture conditions.

manufacture

Production of commercial blasting explosives in licensed factories was 161 million pounds—down 2 million pounds from 1959. Considerable quantities of ammonium nitrate were blended with fuel oil at site of work under the *Ammonium Nitrate and Fuel Oil Order*; the actual figures are not known.

Eighteen factories were licensed (Appendix A)—two fewer than last year; Cyanamid of Canada Limited and Montreal Fireworks Displays and Manufacturing Company ceased production in 1959, the latter after

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possessing a factory licence since 1926. Three other small fireworks factories—Croname (Canada) Limited, Superior Toy Limited, and Safety Flares and Fireworks Limited—discontinued production during 1960 and have not renewed their licences for 1961.

The year was marked by the first manufacture of pentaerythrite tetranitrate in Canada at the Beloeil factory of Canadian Industries Limited. This explosive, formerly imported, is used in the manufacture of authorized blasting accessories such as detonators, detonating fuse, and boosters.

authorization and testing

During the year 239 samples were received and examined by the laboratory as follows:

Commercial Blasting Explosives	
(a) for authorization.....	26
(b) factory run-of-work.....	25
Fireworks	
(a) for authorization.....	105
(b) factory run-of-work.....	8
Small-arms Ammunition.....	50
Blasting Accessories.....	2
Accident Investigations.....	3
For other Government Departments.....	16
Miscellaneous.....	4

Many of the small-arms-ammunition samples represent shipments of surplus military ammunition imported for use in sporting rifles.

The samples “for other Government Departments” denote assistance in assessing hazards of handling and transporting explosives and other dangerous goods. Chiefly involved are the Department of National Defence, the Department of Transport, the Post Office Department, and the RCMP.

Thirty-four shipments of Chinese firecrackers were sampled and tested by the RCMP at the Port of Vancouver.

A complete list of explosives authorized for manufacture and importation is given as Appendix D.

licences, permits and certificates

The following were issued during the year; 1959 figures are in parentheses:

Factory Licences.....	18	(20)
Magazine Licences (storage for sale).....	454	(471)
Temporary Magazine Licences (storage for private use).....	1,035	(1,019)
Registered Premises Certificates (storage of small quantities for sale).....	104	(98)
Transportation Permits (by road).....	296	(300)
General Importation Permits (one shipment only).....	1,374	(1,421)
Annual Importation Permits.....	59	(59)

imports

Explosives imported during the year are detailed in Appendix B. The large quantity described as "for other manufacturing purposes" is mainly nitro-cellulose used in the manufacture of lacquers, coated fabrics and films. The phrase "for use in explosives factories" describes explosives used as components of commercial products and for which there are no Canadian manufacturing facilities at present.

inspections

Listed below are the type and number of inspections carried out during the year, including those by Deputy Inspectors of Explosives of the RCMP; 1959 figures are in parentheses:

Factories.....	45	(51)
Magazines.....	2,572	(2,444)
Registered Premises.....	156	(170)
Transportation.....	149	(143)
Storage in Unlicensed Premises.....	145	(194)

thefts

Twenty-five thefts were reported, altogether involving 1,950 pounds of dynamite and 5,121 detonators. Seventeen of the thefts were from licensed magazines, entry having been gained by forcing the locks. In sixteen of the

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thefts, the explosives were recovered, or partly so, during the police investigation. The culprits were apprehended in nine cases, and court action followed in five.

The most notable feature of the theft statistics is the disclosure that juveniles or teenagers were responsible for at least ten of the twenty-five thefts, and the stealing of more than 4,000 of the detonators. An example worth mentioning is one which occurred in British Columbia just before Christmas. A magazine licensee reported that he suspected juveniles of breaking into both the dynamite and detonator magazines and stealing 30 sticks of stumping powder, 1,150 detonators, 200 feet of safety fuse, 4 spools of connecting wire, and 3 pairs of cap crimpers. Although the padlocks were protected with shields, the hasps had been severed with a hacksaw. During an inspection just 8 days later, the owner found four boys, aged 16 and 17, busily at work on a break-in. This time entry had been gained by enlarging one of the lower ventilating openings, and one of the boys was inside passing sticks of explosive out to his companions for repacking. Two of the boys admitted guilt of both thefts and were placed on probation for 2 years; the other two boys were given 1 year. The boys said that they intended to keep the explosives for 'blasting fish' the following summer.

abandoned explosives

The carelessness indicated by this subtitle is obvious but there is annual evidence of it. Reports of explosives found abandoned numbered 26, compared with 47 in 1959. Total quantities found were 1,421 pounds of dynamite, 951 detonators, and small amounts of miscellaneous explosives. Often such explosives are of considerable age and in a deteriorated condition. One instance involved a magazine containing 450 pounds of dynamite formerly licensed in the name of a logging company in British Columbia; the magazine was forgotten following a change in ownership of the company. Not infrequently the finders are juveniles, and sometimes the results are disastrous as can be seen from the 'Accidents' section of this report.

The negligence and indifference indicated by one of the reports of abandonment is difficult to believe. In Toronto, 18 sticks of dynamite were deliberately deposited with city garbage as a means of disposal. Fortunately the explosive was recognized just before it reached the city incinerator. Legal authorities declined to recommend prosecution.

destruction of explosives

Explosives reported destroyed during 1960 totalled 69,600 pounds of blasting explosives and 4,734 detonators. These quantities include the abandoned explosives referred to above. There were 36 reports of destruction because of age and deterioration when inspectors condemned such explosives as unfit for use.

Contractors constructing a radar line in Northwest Territories found themselves with 17,450 pounds of dynamite and 4,000 detonators which were surplus to the work and partly deteriorated. The entire cache was destroyed.

When ice damaged the hull of a steamship carrying a shipment of 100,000 pounds of dynamite to a nickel mine in Northwest Territories, some of the explosive became wet; after unloading it was found that 24,700 pounds were unfit for use and had to be destroyed.

Following completion of a hydro power project in Northern Quebec a quantity of 19,400 pounds of a gelatin explosive—surplus to the work and 3 years old—was destroyed by burning.

Unauthorized fireworks—cigarette loads and trick matches referred to in the next section of this report—were destroyed by the RCMP following prosecutions under Sections 5(1) and 23 of the Act.

prosecutions

Thirty-four persons and companies were prosecuted during the year. This compares with 28 in 1959 and 44 in 1958.

Twenty-one of the prosecutions followed offences involving improper and insecure storage, but one of these also included charges under Part VI of the Regulations governing transportation. Fines varied from \$10 to \$870. In the latter case a road-construction contractor who treated explosives in very casual fashion was convicted on 24 counts involving various rudimentary rules governing safe storage; and of course he had not bothered to obtain a magazine licence.

There were 11 prosecutions for violations of regulations governing safe road-transportation. Offences were for transporting explosives as follows: in a towed vehicle; without a permit; without warning signs; without a fire

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extinguisher; leaving vehicle unattended; vehicle not in sound mechanical condition; and exceeding the speed limit of 40 miles per hour. Fines ranged from \$10 to \$95.

Following a complaint from a match manufacturer whose products were being 'doctored', the RCMP uncovered a ring that was illegally producing and distributing trick explosive matches and cigarette loads. Two persons were prosecuted and convicted for the manufacture and sale of unauthorized fireworks. The retailers, when they surrendered the devices for destruction, were not charged.

Eight teenaged youths were prosecuted and convicted under the Criminal Code in two cases of theft involving dynamite and detonators. In another Criminal Code case a mentally retarded boy was committed to an industrial school following experiments in which he exploded a stick of dynamite.

accidents

Appendix C, Part I, is an analysis of all accidents involving death or injury which came to notice during 1960. The total from all causes is 111 which compares with the latest 10-year average of 118.

—in use

(1960) 71 accidents, 10 killed, 81 injured

(1959) 66 accidents, 13 killed, 70 injured

An examination of the "in use" statistics reveals again that more than one third of the accidents—adding together causes c, d and o—have resulted from failure to take adequate precautions against the effects of an expected detonation. Users would do well to remember always that explosives are unpredictable, as are the effects of explosions. Worth pondering is the statement made a few years ago by a Nova Scotia construction contractor: "I have used this stuff for 30 years and I don't know anything more about it than when I started."

One of the accidents illustrates with tragic emphasis the unpredictability of explosions. Near the end of August, at a quarry near Corner Brook, Newfoundland, preparations were made to fire a coyote blast to supply fill for a railway construction project. The loading of the tunnel with 54,000 pounds of explosives was supervised by an expert who predicted from previous experience that no debris would be thrown farther than 750 feet. After

careful warning to the general public, four members of the local detachment of the RCMP were assigned to control traffic at strategic points on nearby roads. The blast, touched off at 3.30 p.m. on August 27th, resulted in the death of a young man who was standing with three others at one of the traffic-control points 1,350 feet from the site of the blast. He was struck on the head by a fragment of rock and died 3 hours later. Another fragment penetrated the roof of a house about 2,200 feet from the blast area. In last year's report reference was made to the safety poster which warns *The Best Protection from Flying Debris is Distance*. This is true enough but, regardless of distance, some sort of cover is an important additional precaution.

Another feature of the year's statistics is that a third of the "in use" accidents resulted from 'drilling into explosives' and 'striking unexploded charges in removing debris'. Greater care would have prevented many of these 24 accidents caused by unfired explosives left in bootlegs and blast debris.

— in manufacture

(1960) 3 accidents, 3 injured

(1959) 3 accidents, 1 killed, 2 injured

The three 1960 accidents resulted in minor injury only. One occurred in a small fireworks factory, one in the manufacture of safety cartridges, and the third involved a laboratory technician at a detonator factory.

A fourth accident must be mentioned because of its serious potential. About 3 months after the pentaerythrite-tetranitrate plant opened at the Beloeil, Quebec factory of Canadian Industries Limited, there was an explosion in the piping of the spent-acid stabilization unit; this is in the open, adjacent to the nitration building. No one was hurt but damage caused a 3-week shutdown. Based on an exhaustive report prepared by the company, changes have been made in design and operation, which should prevent a recurrence.

— in storage

(1960) 1 accident, 4 killed

(1959) 1 accident, no casualties

On August 7th four men were killed in a tragic accident on a farm south of Regina. In some unknown manner the men caused the explosion of about 350 pounds of dynamite kept in the attic of a dilapidated and disused building

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that formerly served as a granary. Since the victims were carrying rifles, suspicion points to a rifle bullet as the cause, but the mangled and dismembered condition of the bodies suggested close proximity to the explosion. Evidence indicated that one of the men was aware of the presence of dynamite in the building and it is possible that the men may have handled or tampered with it.

There is a vital lesson to be learned from this accident when we consider the history of these explosives. This was ditching dynamite distributed as a free issue in 1955 and 1956 by the provincial government to assist farmers in reclaiming land from floods. After completion of the work this particular surplus quantity was harbored for future use and was no doubt in a dangerously sensitive condition from deterioration. Ignorance of the properties of explosives—and failure to observe the law respecting storage—are the basic causes of such a disaster. Keeping things for an indefinite future use is a human characteristic that can be a dangerous foible when it concerns explosives; in this case four corpses serve as the proof of this statement. And it is significant that, following the accident, several persons in the area sought help in disposing of surplus explosives. Agriculture Department representatives were of course alerted to make every effort to trace other possible caches.

Another accident investigated by one of the inspectors deserves comment because it illustrates the serious consequences that may follow thoughtlessness in the storage of small quantities of explosives removed from a licensed magazine for immediate use. A quantity of 125 pounds of dynamite exploded during a fire in a shack at the site of a housing-construction project near Montreal. The building was of the multiple-purpose type commonly found at construction sites and which, in winter, generally houses a stove. In this instance it also contained, in a partitioned room, the dynamite receptacle. On the morning of January 7th, after the shotfirer had placed the explosives in the locked receptacle and was carrying out preparations for drilling, other workmen started a fire in the stove using a resinous compound to get quick results. The results were indeed so quick that two men sustained burns when the stove 'blew out'. The ensuing fire engulfed the shack and 10 minutes later the dynamite exploded. The shotfirer's warning to keep away prevented casualties. Damage, except for the complete destruction of the shack, was confined to shattered window-panes in a number of the houses under construction. The moral is obvious: explosives are not compatible with any source of heat or flame. A similar accident was recorded in our 1954 report.

—in transportation by road

(1960) 1 accident, 1 killed

(1959) no casualties

The foreman of a mine in British Columbia was instantly killed in the cab of a truck while he was transporting 150 pounds of dynamite from one part of the mine to another. There were no witnesses but evidence indicated that the vehicle had gone only 120 feet when the explosive detonated, completely demolishing the truck and leaving a crater 3 feet deep. Careful investigations under the Explosives Act and the provincial Mining Act left the cause undetermined. There may have been an electric detonator involved but this could not be proven. Lightning had occurred about 2 hours before but none was reported at the time of the accident. There was no evidence of foul play.

During the year two other accidents involved the destruction of vehicles with their explosives loads, but fortunately there were no casualties. On an isolated and rough road in Quebec a truck loaded with 10,000 pounds of dynamite caught fire and burned without detonation. The driver had stopped for repairs to the engine. When he started again, he noticed flames under the cab; attempts to control the fire failed. *The fire extinguisher was not in working order.* Driver and helper abandoned the vehicle to warn oncoming traffic.

Near Kingston, Ontario, a small pickup truck caught fire and exploded. It was carrying 250 pounds of dynamite in the box and 425 electric detonators in the cab. Except for total destruction of the truck the only damage was to a roadside power-line. The fire appeared to originate with the tarpaulin covering the boxes of explosives. When the tarpaulin was pulled off and it was noted that the fibreboard of the dynamite boxes was afire, the driver and helper withdrew to warn traffic. The blast occurred about 10 minutes later and was followed by small detonator explosions which persisted for about half an hour. The source of ignition was not definitely determined, but it could have been a lighted match or a burning cigarette thrown from a passing vehicle. Laboratory tests showed that the tarpaulin was certainly not fire-resistant as required by the regulations, though it may have been so originally because it was purchased as such. A new tarpaulin was shown to be much more fire-resistant.

Five other incidents were reported but in no case was there fire or explosion. Three involved a collision with another vehicle; one was an upset on an icy

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road; and the other concerned 3 boxes of explosives that fell from a truck when the tailgate was detached on a rough road.

A study of these 1960 statistics again emphasizes that property of explosives which must always be borne in mind—unpredictability. Everyone who drives a vehicle on a public road assumes a serious responsibility but this responsibility becomes many times compounded when the vehicle carries explosives. The Division has republished *A Warning About Trucking Explosives* in a pocket-size format which is being distributed to all magazine licensees.

—in misuse

(1960) 33 accidents, 1 killed, 64 injured

(1959) 27 accidents, 4 killed, 34 injured

Brief accounts of all misuse accidents are given in Appendix C, Part II. Of the thirty-three for 1960, fourteen were caused by playing or tampering with detonators. As was feared, the record low of five accidents in 1959 was not prophetic of a trend.

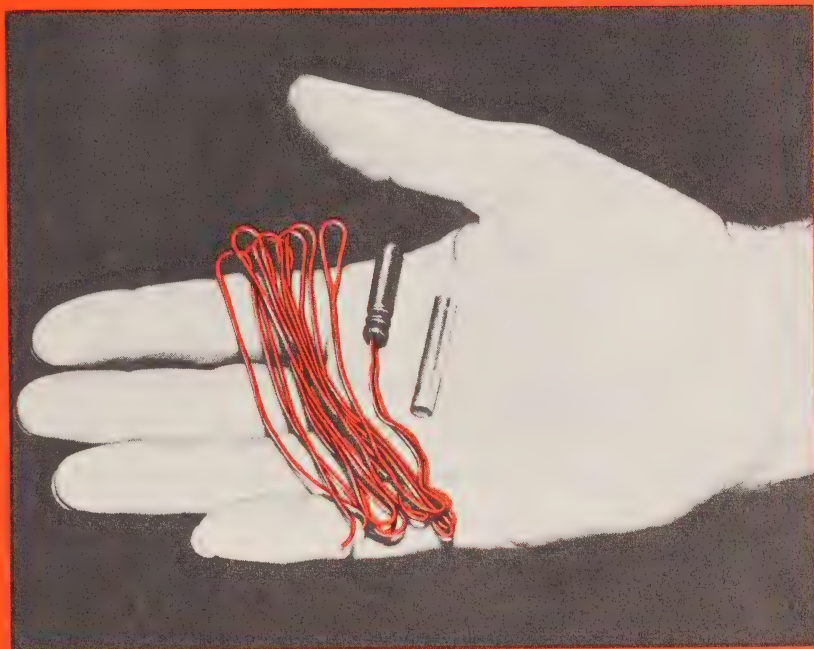
One of the accidents was particularly distressing in that a 7-year-old girl was maimed and blinded for life. Seven children, aged 3 to 8 years, were playing in a farm shed near Pembroke, Ontario, when one of them in the loft found a rusty metal container which he rattled and thought contained nails. He was unable to open it and tossed it down to his sister who tried to open it by throwing it against the wall and striking it with a stick. The number of detonators that exploded is unknown but there were others found in the building, and the type and package indicated that they may have been lying about for as long as 30 years. It is frightening to realize that there may be numerous other such illegal caches throughout the country.

In the continuing war against this detonator type of accident, the Division has published a warning poster which is being distributed to all holders of magazine licences and registered premises certificates. Nearly all of these accidents are of course the result of someone's careless and illegal storage of detonators.

A tragic accident happened near Cornwall, Ontario. A 16-year-old boy on a fishing expedition with his 6-year-old brother, entered an unlocked shack where they found the remainder of a quantity of gunpowder that had been used to split logs. In some unknown manner they ignited the explosive causing a flash that burned them critically. Apparently the boys immersed

PLEASE POST THIS NOTICE WHERE IT WILL DO THE MOST GOOD

You wouldn't Hurt a CHILD!



**Every year about TWENTY Children
are maimed or blinded by these things**

Observe the law and keep Blasting Caps Locked Up!

Make sure that every single Cap is accounted for . . .

THE CHILD YOU SAVE MAY BE YOUR OWN

ISSUED BY CHIEF INSPECTOR OF EXPLOSIVES, DEPARTMENT OF MINES AND TECHNICAL SURVEYS, OTTAWA

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themselves in a nearby stream and then, in spite of terrible burns, the older boy carried his brother home—a distance of about half a mile. The older boy died in hospital a few hours after admission but the younger child survived. The owner of the powder was prosecuted and convicted for failure to provide the security required by the regulations.

Nearly all of the fireworks accidents in Canada happened during May, the month in which Victoria Day—the traditional ‘fireworks day’—is celebrated. Most of the accidents resulted from misuse of the noise-making type of fireworks. In the interest of bigger and better bangs, boys confine the devices in bottles and cans. Closer parental control and supervision appears to be the best measure for preventing this type of accident.

There were five recorded accidents with home-made explosives—a drop from thirteen in 1959. Only one was ascribed to amateur rocketry, which indicates that the ‘sputnik’ craze has subsided, at least temporarily. In the other four accidents, disaster followed the familiar pattern of ‘bomb-making’ in which an explosive concoction is tamped into a metal pipe capped at one end and ‘fused’ at the other. In the continuing campaign against this sort of accident many more copies of the Division’s booklet *Explosives—A Continuing Danger* were distributed during 1960 through the good offices of safety councils and educational authorities.

APPENDICES

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appendix A

Factories Licensed to Manufacture Explosives, 1960

Owner	Location of Factory	General Nature of Product
Canadian Industries Limited.....	Beloeil, Que.....	Blasting explosives, black powders, nitro-compounds
Canadian Industries Limited.....	James Island, B.C....	Blasting explosives
Canadian Industries Limited.....	Nobel, Ont.....	Blasting explosives
Canadian Industries Limited.....	Brainerd, Man.....	Blasting explosives
Canadian Industries Limited.....	Brownsburg, Que....	Ammunition, detonators, blasting accessories, fusees, railway torpedoes
Canadian Industries Limited.....	Calgary, Alta.....	Blasting explosives
Canadian Safety Fuse Company Limited	Brownsburg, Que....	Safety fuse, detonating fuse, blasting accessories
Canadian Arsenals Limited.....	St. Paul l'Ermite, Que.....	Filling military shells and fuzes
Canadian Arsenals Limited.....	Valcartier, Que.....	Filling military small-arms ammunition
Canadian Arsenals Limited.....	Valleyfield, Que.....	Military explosives, propellants
DuPont of Canada Limited.....	North Bay, Ont.....	Blasting explosives
T. W. Hand Fireworks Co. Limited ...	Cooksville, Ont.....	Fireworks and military pyrotechnics
T. W. Hand Fireworks Co. Limited ...	Papineauville, Que...	Fireworks and military pyrotechnics
Croname (Canada) Limited.	Waterloo, Que.....	Toy pistol caps
W. F. Bishop & Son Limited.....	Unionville, Ont.....	Fireworks
Superior Toy Ltd.....	Dundas, Ont.....	Toy pistol caps
Safety Flares & Fireworks Limited....	Orangeville, Ont....	Highway fusees
Iron Ore Company of Canada.....	Schefferville, Que....	Ammonium nitrate - fuel oil

appendix B

Explosives Imported into Canada, 1960

Class	Division	Description	Quantity
I		Gunpowder.....	35,795 lb.
II		Nitrate mixtures.....	1,085 lb.
III		Nitro-compounds—	
		Blasting explosives.....	391,727 lb.
	2	(a) Propellants.....	30,160 lb.
	2	(b) For use in explosives factories.....	6,205,572 lb.
	2	(c) For other manufacturing purposes.....	4,169,885 lb.
VI	1	Primers.....	1,359,150
	1	Safety fuse.....	5,710 ft.
	1	Safety cartridges.....	23,540,623 rounds
	2	Detonating fuse.....	102,846 ft.
	2	Seismic explosives.....	29,534 lb.
	2	Blasting explosives.....	2,981,199 lb.
	3	Detonators.....	142,022
VII	2	Manufactured fireworks.....	1,205,560 lb.
		Miscellaneous.....	23,141 lb.

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appendix C

Part I—Accidents Involving Explosives, 1960

Circumstances or Cause	Mines and Quarries			Elsewhere			Total		
	Acci- dents	Killed	In- jured	Acci- dents	Killed	In- jured	Acci- dents	Killed	In- jured
In Use									
a Delaying too long in lighting fuse.....	4	1	6				4	1	6
b Premature firing of electrical blasts.....									
c Not taking proper cover.....	5		5	7	1	6	12	1	11
d Projected debris.....	4		4	9	1	8	13	1	12
e Returning too soon after blasting.....	2		2	1	1		3	1	2
f Improper handling of misfires.....									
g Rough tamping.....									
h Ignition of explosives by flames, sparks, etc.....	1		1				1		1
i Drilling into explosives.....	15	3	19	2	1	2	17	4	21
j Striking unexploded charge in removing debris.....	6		7	1		3	7		10
k Preparing charges.....	2		4				2		4
l Using too short a fuse.....	2		4				2		4
m Insufficient ventilation after blasting....	1		2				1		2
n Springing shots.....				1		1	1		1
o Inadequate guarding.....	2		2				2		2
p Various.....	6	2	5				6	2	5
Total.....	50	6	61	21	4	20	71*	10	81
In Manufacturing.....							3		3
In Storage.....							1	4	
In Transportation (by road).....							1	1	
Total.....							5	5	3
In Misuse									
(a) Detonators.....							14		32
(b) Other explosives.....							5	1	6
(c) Fireworks.....							9		17
(d) Home-made explosives.....							5		9
Total.....							33†	1	64
Miscellaneous.....							2†		2
Total All Circumstances.....	50	6	61	21	4	20	111	16	150

* These accidents occurred in circumstances not directly controlled by the Act.

† Brief descriptions of these accidents are given on the following pages.

appendix C

Part II—Misuse of Explosives

Ref. No.	Cause of Accident	Killed	Injured
<i>(a) Detonators</i>			
5-1	Six children, aged 6 to 9 years, played with detonators they took from an unlocked box at a sewer-construction project. One boy was slightly injured when a detonator exploded.....		1
6-2	A 15-year-old youth lost three fingers when he struck a detonator with a hammer. Two companions were slightly injured. Detonators were obtained at a construction site. The owner was prosecuted and fined for illegal storage.....		3
2-4	A 10-year-old boy was slightly injured by the detonation of a blasting cap which he had thrown into a small fire. Detonators were taken from an unlocked shack.....		1
4-4	Two juveniles sustained minor injuries when one of them applied a match to a detonator and it exploded. Detonators of an old type were found in an unlocked shed at the home of one of the boys.....		2
1-6	A 14-year-old boy sustained serious injury to his right hand when he pounded a detonator with a rock and it exploded. Detonators were found in a trench at a construction job.....		1
2-6	Five young boys were injured when they obtained dynamite and detonators from an unlocked shed and ignited them. The owner was prosecuted.....		5
3-6	Two 14-year-old boys sustained minor injuries when an axe used by one of the boys struck a detonator as they were cutting brush along the highway. This part of the highway was under construction about a year before and it is believed that the detonator was abandoned or lost by the construction crew.....		2
2-7	A 13-year-old boy lost parts of his left index finger and thumb when he caused a detonator to explode by heat generated with a magnifying glass. His companion sustained only minor lacerations. They had found the detonators at a mine property.....		2
3-7	Children playing in a farm shed found a metal container full of detonators and attempted by violent means to open it. The ensuing explosion resulted in nearly total blindness to a 7-year-old girl as well as a serious hand injury. Five other children sustained minor injuries. The old type and package indicated that the detonators had been in the shed for perhaps 30 years.....		6
4-8	Two 15-year-old youths sustained numerous puncture wounds when a detonator exploded. One of the boys, being unaware it was a detonator, struck it with a hatchet and on the third blow it exploded.....		2

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Part II—Misuse of Explosives—Continued

Ref. No.	Cause of Accident	Killed	Injured
	(a) Detonators—Concluded		
3-9	Three young children were injured by the explosion of a detonator they struck with a rock. They found the detonator where a magazine had been located. The magazine owner was prosecuted.....		3
2-10	A 14-year-old youth sustained minor injuries to his legs when he detonated a blasting cap by striking it with a stone. Detonators and dynamite were found in an unlocked basement at a housing-construction project.....		1
3-10	A boy aged 17 was severely injured at a Halloween celebration when he lit a capped fuse and held it in his hand. His friend suffered slight burns.....		2
1-11	A 12-year-old boy suffered injuries to his hand when he struck a detonator with a stone and caused it to explode. Together with a companion he had entered a stable by removing a side panel and taken dynamite and detonators stored there. The owner was prosecuted and fined \$100 for improper storage.....		1
	(b) Other Explosives		
1-4	A 16-year-old boy was killed and his younger brother was badly burned when they ignited black powder stored in a shack. The owner was prosecuted for illegal storage.....	1	1
4-7	A 7-year-old boy suffered from shock and injuries to his face and eyes from the explosion of a railway-track torpedo. Apparently the boy found the torpedo near a railway-car shop; he placed it on the track and hit it with a piece of pipe.....		1
1-8	A 3-year-old boy was slightly injured while playing with a .303 cartridge. He had found a number of abandoned cartridges which were badly corroded.....		1
1-9	An 8-year-old boy took a railway-track torpedo that had been placed on the track by a work crew. Upon exploding the torpedo he received burns to his hands and arms and had to be hospitalized.....		1
2-9	Two youths were injured while mishandling stud-driver cartridges that they took from a shack at a construction site.....		2
	(c) Fireworks		
4-1	On board ship at an eastern port, four young German seamen were injured setting off ship's rockets in celebration of New Year's. Two sustained skull fractures and injuries to the eyes and another lost his left hand.....		4
2-5	Five children sustained minor burns at a fireworks display when a fragment from an exploding aerial shell landed among the spectators.....		5

Part II—Misuse of Explosives—Continued

Ref. No.	Cause of Accident	Killed	Injured
(c) Fireworks—Concluded			
5-5	A 4-year-old boy lost an eye from glass splinters sprayed by firecrackers exploding in bottles.....		1
6-5	A 14-year-old youth was treated in hospital for second-degree burns suffered when eight large firecrackers exploded in his pocket.....		1
7-5	An 18-year-old youth suffered a badly injured left hand when a firecracker he was holding exploded.....		1
8-5	An 11-year-old boy lost an eye from glass splinters sprayed by firecrackers exploding in bottles.....		1
9-5	A 20-year-old youth was admitted to hospital with an eye injury. He and other youths had been throwing firecrackers at each other in a field.....		1
10-5	A little girl threw a firecracker which bounced into the pocket of a 12-year-old boy, setting off several other crackers and sending him to hospital with painful burns.....		1
2-11	Twin sisters, 6 years old, were hospitalized with second-degree burns covering more than 60 per cent of their bodies. Their flimsy Halloween costumes were set afire by a 'sparkler'.....		2
(d) Home-made Explosives			
5-3	A 12-year-old boy lost a finger and a companion lost part of a tooth when a home-made rocket exploded during an attempted launching.....		2
3-4	Three high-school students were seriously injured following a violent explosion in the basement of a residence. They had filled a metal pipe with a home-made explosive mixture and were in the act of affixing a threaded cap. One sustained a mutilating hand injury and the other two suffered leg and body wounds.....		3
5-4	A 16-year-old amateur scientist lost his left hand when a home-made bomb exploded. A member of a teenage science club, the boy had capped a length of tube at one end and was filling it with some explosive material.....		1
6-4	A 15-year-old boy lost the tip of the ring finger of his left hand when a home-made bomb exploded. The boy and three friends had put home-made gunpowder into a steel tube and ignited it.....		1
4-6	Two 17-year-old youths were seriously injured as they were tilting a home-made bomb to light the fuse when some of the powder apparently ran out and the 'bomb' exploded. It is believed they emptied shotgun shells to obtain gunpowder and filled a 7-inch section of pipe. One youth lost his left hand and suffered badly gashed legs and body. The other sustained injuries to his shoulder, right eye and stomach.....		2

EXPLOSIVES DIVISION

Part II—Misuse of Explosives—Concluded

Ref. No.	Cause of Accident	Killed	Injured
	<i>Miscellaneous</i>		
4-3	A man was injured by the explosion of a bomb which had been wired to the ignition system of his car. The guilty person was convicted under the Criminal Code and sentenced to 8 months imprisonment.	1
1-10	An employee of an explosives dealer was injured by the blast of an electric detonator while unloading a truck of explosives returned from a customer. The detonator had fallen to the ground from a package and it exploded when he picked it up. The cause was not definitely determined but the truck body may have provided sufficient electric impulse by contact through his other hand. Obviously the detonators were not properly packed for transportation as required by the Regulations.	1

appendix D

*Authorized Explosives***Manufactured in Canada***Canadian Industries Limited (Ammunition Division), Montreal, Que.*

Detonators and Electric Detonators
 Dextrinated Lead Azide
 Highway Flares
 Igniter Cord Electric Starter
 Lead Salt
 Lead Styphnate (Normal)
 Marine Flares
 MS Detonating Relay
 Percussion Caps
 Railway Fuses
 Railway Track Signals
 Safety Cartridges
 Styphnic Acid
 "Sureshot" and "Seismic Marine" Boosters
 Tetrazene

Canadian Industries Limited (Explosives Division), Montreal, Que.

Amex—A and B
 Amite
 Ammonia Dynamite—20, 25, 30, 35, 40, 50 and 60 per cent
 Ammonia Dynamite, Agricultural—60 per cent (for export only)
 Ammonia Dynamite Extra—40, 50, 60 and 70 per cent (for export only)
 Ammonia Dynamite, Free Running—40 and 65 per cent
 Ammonia Dynamite, High Density—20, 25, 30, 35, 40, 50 and 60 per cent (for export only)
 Ammonia Dynamite, Low Density—20, 25, 30, 35, 40, 50, 55 and 60 per cent (for export only)
 Ammonia Dynamite, Quarrying—60 per cent
 Ammonia Dynamite, Seismograph—60 per cent (for export only)
 Ammonia Dynamite, Stumping—20 per cent (for export only)
 Ammonia Gelatin—30, 35, 40, 50, 60, 75, 80 and 90 per cent (for export only)
 Black Blasting Powder
 Blastol—60 per cent
 BRX-7—75 per cent
 Cilgel-B and Cilgel-C—70 per cent
 C.I.L. Dynamite—Nos. 3 and 5
 C-X-L Dynamite No. 5
 C-X-L Gelatin—Nos. 1 and 2
 C-X-L-ite
 Detonating Fuse Primer
 Ditching Dynamite—50 per cent
 Driftite-D—70 per cent
 Dygel—75 per cent
 Dynamex—40, 50, 60, and 70 per cent
 Exel-G, Exel-S and Exel GW—75 per cent
 Explosives BL-100, BL-112, BL-114, BL-115, BL-116, BL-125, BL-130, BL-132, BL-134, BL-135, BL-136, and BL-140
 Forcite—30, 35, 40, 50, 60, 75, 80, and 90 per cent
 Fuse Powders—35, 40, 44, 53, and 65 seconds

EXPLOSIVES DIVISION

Authorized Explosives—Continued

Manufactured in Canada—Continued

Gelatin Dough—90 per cent
Geogel
Giant Gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent
Guhr Dynamite
Guncotton
Gunpowder
Hi-Velocity Gelatin—40, 60, 75, and 80 per cent
Hydromex and Hydromex-D
Liquid Nitroglycerine
Loshok
Monobel—Nos. 4, 6, 7, 10, 11, 14, and X(EQ.S.)
Nitrocotton
Nitrone—S-1, T-1, T-3, T-4, and S-M
Nitrone Primer and Nitrone S-1 Primer
Nitropel
Nitrox
Pentaerythritol Tetranitrate
Polar Stumping Powder—20 per cent
Primers—Pentolite, Pento-Lok, and Pento-Mex I, II and III
Pyromex
Seismic Gelatin—60 per cent (for export only)
Semi-Gelatin No. 1, 2, 3, 4 and 5 (for export only)
S.N.G.
Stopeite—20, 25, 30, 35, 40, 50, 55, and 60 per cent
Straight Gelatin—25, 30, 35, 40, 50, 60, 75, 80, and 90 per cent (for export only)
Submagel—40, 50, 60, 75, 80, and 95 per cent
Trinitrotoluene
Vibrex—60 per cent
Xactex

Canadian Safety Fuse Company Limited, Brownsburg, Que.

Detonating Fuse—"B-Line", "Primacord"
Hot Wire Fuse Lighters
Igniter Cord—"Thermalite" brand, types A and B
Igniter Cord Connectors—"Thermalite" brand
Safety Fuse

Cyanamid of Canada Limited, Niagara Falls, Ont.

Nitroguanidine

DuPont of Canada Limited, Montreal, Que.

DuPont Ditching Dynamite
DuPont Extra—Nos. 1, 2, 3, 4, and 5
DuPont Gelatin—25, 40, 50, 60, and 75 per cent
DuPont Stumping Dynamite
Energex—40, 50, and 60 per cent
Energex FR—25, 40, and 65 per cent
Energite—40, 50, and 60 per cent
Gelex-A—1, 2, 3, 4, and 5
Gypsal—Nos. 1 and 2
Hi-Cap—1, 2, and 3
Hi-Velocity Gelatin—40, 60, and 75 per cent

Authorized Explosives—Continued

Manufactured in Canada—Continued

DuPont of Canada Limited, Montreal, Que.—Concluded

NBL-101, NBL-102, NBL-201, NBL-203, NBL-204, NBL-205, NBL-301, NBL-302,
NBL-304, NBL-306, NBL-307, NBL-402, and NBL-403

Nilite FR—101 and 102

Nitramon Primers

Pelletol—Nos. 1 and 2

Pentolite Primer

Semi-Gelatin No. 1

Special Gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent

Submarine Hi-Velocity Gelatin—60 and 80 per cent

Tovex

Pursuant to Section 8 of the Act, ammonium nitrate blended with fuel oil is an authorized explosive.

Manufactured by Foreign Firms

Aktiebolaget Bofors, Nobelkrut, Bofors, Sweden

Smokeless Sporting Powder

Detonating Fuse (Bofors type)

American Cyanamid Co., Latrobe, Pennsylvania

Fulminate of Mercury

Detonators

Atlas Diesel Co., Stockholm, Sweden

Engine Starting Cartridges

Atlas Powder Co., Wilmington, Delaware

Atlas Gelatin—60 and 75 per cent

Atlas RXL-198

Detonators

Giant Gelatin—40, 60, and 75 per cent

Giant Gelatin, Hi-Velocity—60 per cent

Shaped Charges

Subgel A

Austin Powder Co., Cleveland, Ohio

Ammonia Dynamite—AL-4 and 60 per cent

Apcomite 20-A

Austinite—Nos. 15, 20, and 21

Black Pellet Powder

Detonating Fuse

Primers—Pentolite, ANP-16 Amatol, and ANP-16 Sodium Amatol

Leon Beaux & Co., Societa Italiana Munizioni, Milan, Italy

Safety Cartridges

Baschieri and Pallagri, Bologna, Italy

Smokeless Powder

Bermite Powder Co., Saugus, California

Baker Power Charge

Firing Head Igniter

EXPLOSIVES DIVISION

Authorized Explosives—Continued

Manufactured by Foreign Firms—Continued

Bombrini Parodi-Delfino, Rome, Italy
Safety Cartridges

Cardox Corporation, Chicago, Illinois
Cardox
Cardox Heaters

Cartoucherie Française, Paris, France
Primers and Primed Cases
Safety Cartridges

Cascade Cartridge Co., Lewiston, Idaho
Primers

E. I. DuPont de Nemours & Company, Inc., Wilmington, Delaware

Auxiliary Charges C. 63
Black Fuse Powder
Detonators and Electric Detonators
DuPont Bulk Powder
DuPont Ditching—50 per cent
DuPont Extra—A, C, E, F, and G
DuPont Gelatin—25, 40, 50, 60, and 75 per cent
Elcord Delay Unit
Explosive Rivets
Fulminate of Mercury
Gelex—Nos. 1, 2, and 3
Hi-Velocity Gelatin—40, 60, and 75 per cent
Jet Tappers
Nitramon—A, 2, and S
Nitramon Primer and Nitramon S Primer
Nitramex—2 and 2H
Nitramite
Nitramite Primer
Nitrocellulose
Nitrostarch
Oil Well Explosives—S.O.W.E. No. 1 and EL-431-A
P.6 Seismograph Booster
Pelletol—Nos. 1 and 2
Pentaerythritol Tetranitrate
Plastic Primer
“Primacord” Booster
“Primacord” MS Connector
Primer HDP-1
Red Cross Extra—40, 50, and 60 per cent
Red Cross Extra (H.W.R.)—40, 50, and 60 per cent
Shaped Charges
Sheet Explosive EL-506A
Smokeless Powders
Special Gelatin—30, 40, 50, 60, 75, 80, and 90 per cent
Special Primer with Booster (4 × 7.5 lb.)
Submarine Hi-Velocity Gelatin—60 and 80 per cent
Tetryl
Waterproof Booster C.66

Authorized Explosives—Continued

Manufactured by Foreign Firms—Continued

Dynamit Nobel AG, Troisdorf, Germany

Delay Connector
Detonators and Electric Detonators
Detonating Fuse "Nobel Cord"
R.W.S. Rimfire Cartridges
Smokeless Powder

Ellefsens Tendskruefabrikk, Stokke, Norway

Time Fuses and Detonators for Whaling Guns

EM-GE Sportgerate K-G Gerstenberger & Co., Wurttemberg, Germany

Blank Cartridges

Ensign Bickford Company, Simsbury, Connecticut

Detonating Fuse
Ignitacord
Igniter Cup
Lead Spitter
Low Energy Detonating Cord

Federal Cartridge Corporation, Minneapolis, Minnesota

Shotgun Cartridges

Federal Laboratories, Pittsburgh, Pennsylvania

Lachrymatory Cartridges
Powder Loads

Gevelot, S. A., 50 Rue Ampere, Paris, France

Shotgun Cartridges

Giullio Focchi, Lecco, Italy

Power Tool Cartridges, Q 4
Primers and Percussion Caps
Safety Cartridges

Go Oil Well Services Inc., Fort Worth, Texas

Jet Perforators

Greenwood & Batley Ltd., Leeds, England

Shotgun Cartridges

Gustav Genschow & Co., A.G., Hamburg, Germany

Safety Cartridges

Haerens Ammunition Arsenals, Denmark

Safety Cartridges

Hercules Powder Company, Wilmington, Delaware

Detonators and Electric Detonators
Gelatin Oil Well Explosive
Explosive E.P. 172-1 and 2
Gelumite D

EXPLOSIVES DIVISION

Authorized Explosives—Continued

Manufactured by Foreign Firms—Continued

Hercules Powder Company, Wilmington, Delaware—Concluded

- Gelatin Extra—40 and 60 per cent
- High Pressure Gelatin—60 per cent
- Nitrocellulose
- Smokeless Powder
- Titan Booster 20
- Vibro Caps
- Vibrogel B and 3
- Vibronite B

Hirtenberger Patronen, A.G., Hirtenberg, Austria

- Primers and Primed Cases
- Safety Cartridges

Hull Cartridge Co., Hull, Yorkshire, England

- Shotgun Cartridges

Imperial Chemical Industries Limited, England

- Black Sporting Powder—FG, FFG, FFFG, and NFFFG
- Black Whaling Powder
- Cerium Low Tension Fusehead
- Detonating Relay
- Detonators and Electric Detonators
- Gunpowder—G-7, G-12, G-20, SFG-12, and SFG-20
- Pentaerythritol Tetranitrate
- Percussion Caps
- Safety Cartridges
- Saluting Powder
- Smokeless Powders
- Smokeless Whaling Charges
- Tetryl

Intermountain Research & Engineering Co. Inc., Salt Lake City, Utah

- Procore 3C Booster

J. C. Kinley Co., Houston, Texas

- Shells—P No. 51, P No. 70 and P No. 100
- Kinley Sand Line Cutter

Jet Guns Company, Fort Worth, Texas

- Shaped Charges
- Glass Gun Perforating Charges—G.G. 2, G.G. 4, and G.G. 7

K. & G. Oil Tool & Service Co. Inc., Houston, Texas

- Junk Shot

Kilgore Incorporated, Westerville, Ohio

- Powder Loads

King Powder Co., Cincinnati, Ohio

- Black Pellet Powder

Authorized Explosives—Continued

Manufactured by Foreign Firms—Continued

Lake Erie Chemical Co., Cleveland, Ohio
Lachrymatory Cartridges

Lane-Wells Co., Houston, Texas
Gun Perforator Cartridges

Lapua Cartridge Factory, Lapua, Finland
Safety Cartridges

Mecca Cable and Service Inc., Houston, Texas
Magniset Cartridges

Messrs. Germano, Bergamo, Italy
(Distributed by American Rocket Express, Miami, Florida)
Safety Cartridges

Mid Continent Torpedo Co. Ltd., Tulsa, Oklahoma
Red Head Firing Heads

Nitroglycerin Aktiebolaget, Gyttop, Sweden
Shotgun Tracer Cartridges

Omnipol Ltd., Prague, Czechoslovakia
Safety Cartridges

A. B. Norma Projektilfabrik, Amotfors, Sweden
Safety Cartridges

Olin Mathieson Chemical Corp., East Alton, Illinois
Cyclonite
Detonators and Electric Detonators
Kiln Gun Shells
Linemen's Flare Lights
Normal Lead Styphnate
Railway Fusees
Railway Torpedoes
Safety Cartridges, Western and Winchester
Smokeless Powder

T. Page-Wood Limited, Bristol, England
Safety Cartridges

Patronenfabrik, A.G., Solothurn, Switzerland
Safety Cartridges

Perforating Gun Atlas Corporation, Houston, Texas
Jet Perforating Charges

Petroleum Tool Research Inc., Fort Worth, Texas
Detonator Assembly
Vibro-Shot Charge Assembly

EXPLOSIVES DIVISION

Authorized Explosives—Concluded

Manufactured by Foreign Firms—Concluded

Poudreries Nationales, France

D-2 Propellant Powder

Poudreries Royale De Wetteren "Cooppal & Cie, S.A.", Brussels, Belgium

Shotgun Cartridges

Pringle Powder Company, Bradford, Pennsylvania

Liquid Nitroglycerine

Remington Arms Co. Inc., Bridgeport, Connecticut

Safety Cartridges—Remington, Peters and Springfield

Stud Driver Cartridges

Rey Freres, Paris, France

Detonators and Electric Detonators

Detonating Fuse—Plastex and Duplex

Safety Cartridges

Safety Fuse, TT, TR

F. J. Roberts Squib Company, Punxsutawney, Pennsylvania

Miners' Safety Squibs

Rohm-Gesellschaft, Sontheim/Brenz, Kreis Heidenheim, Germany

Blank Cartridges

Signal Cartridges

Karl Schermer and Co., Karlsruhe, West Germany

Animal Stunner Cartridges

Standard Railway Fusee Corporation, Boonton, New Jersey

Railway Torpedoes

Temple Cox Development Co. Ltd., Bromley, Kent, England

Animal Stunner Cartridges

Trojan Powder Company, Allentown, Pennsylvania

Nitrostarch

Trojan—40 per cent S, 50 per cent S, ESX, ESX-LD, PT-3X, and TL-501-B

Weatherby's Sporting Goods Co., South Gate, California

Safety Cartridges

Winchester Arms Company, Cleveland, Ohio

"Tempotool" Cartridges

Authorized Fireworks

Canadian Manufacturers

W. F. Bishop & Son Limited, Toronto, Ont.

Canadian Industries Limited, Montreal, Que.

Canadian Safety Fuse Company Limited, Brownsburg, Que.

Dominion Fireworks Co. Ltd., Dixie, Ont.

T. W. Hand Fireworks Co. Ltd., Cooksville, Ont. and Papineauville, Que.

Authorized Fireworks—Continued***Foreign Manufacturers (Certain Fireworks Authorized*)***

Acme Sparkler and Specialty, River Grove, Illinois
 Aerial Products Incorporated, Merrick, Long Island, New York
 American Railway Signal Company, Fostoria, Ohio
 Anthes Division Gleason Corp., Fort Madison, Ohio
 Astra Fireworks Ltd., London, England
 Atlas Fireworks Co. Inc., Los Angeles, California
 M. Backes' Sons Inc., Wallingford, Connecticut
 E. Benjaminsson, Falu Pyrotekniska Industri, Falun, Sweden
 J. G. W. Berckholtz, Hamburg-Bahrenfeld, Germany
 Hermann Bischoff, Bremen, Germany
 C. T. Brock & Co., Hemel Hempstead, Herts., England
 Brookside Pyrotechnic & Chemical Co., Elkton, Maryland
 Bryant & May Ltd., London, England
 Contimetall Industry (Hemel Hempstead) Ltd., Hemel Hempstead, Herts., England
 EM-GE Sportgerate K-G Gerstenberger Co., Wurttemberg, Germany
 Exportvertrieb Pyrotechnik, Hamburg, Germany
 Thos. Hammond & Company, Craigmillar, Edinburgh, Scotland
 Haley & Weller Ltd., London, England
 Hitt Fireworks Company Limited, Seattle, Washington
 Hudson Fireworks Display Company, Hudson, Ohio
 Illinois Fireworks Co., Danville, Illinois
 Interstate Fireworks Manufacturing and Display Company, Bridgewater, Massachusetts
 Japan Fireworks Trading Company Ltd., Tokyo, Japan
 Jatina Manufacturing Co. Inc., Mount Vernon, New York
 Keystone Fireworks Manufacturing Co. Inc., Dunbar, Pennsylvania
 Kilgore Incorporated, Westerville, Ohio
 Lakeside Railway Fusee Company, South Beloit, Illinois
 Lenover Corporation, Chester, Pa. and Lenover, Pa. (J. Halpern, Pittsburgh, Pa., Distributors)
 Marutamaya Ogatsu Fireworks Co., Tokyo, Japan
 National Fireworks Incorporated, West Hanover, Massachusetts
 New Jersey Fireworks Mfg. Co. Inc., Elkton, Maryland
 S. V. Olsen, Valby Tingsted, 10 Kobenhavn VBY, Denmark
 Olin Mathieson Chemical Corporation, New Haven, Connecticut
 Oswald Bradley Ltd., Southport, Lancs., England
 N. V. Pyro, Klazienaveen, Holland
 Pyro-Chemie (Hermann Weber & Co.) Eitorf/Sieg, West Germany
 Pyrotechnischen Fabriken, Wuppertal-Ronsdorf, Germany
 Pyrowerk, Hamburg-Newgraben, Germany
 Reliance Snap Company, Bishop's Stortford, Herts., England
 Richard Appel's Jo King, New York, New York
 Schermuly Pistol Rocket Apparatus Ltd., Newdigate, Surrey, England
 Schiebeler & Co., Hamburg, Germany
 Shioji and Co. Ltd., Osaka, Japan
 Societe Pyragric, Rillieux (Ain) Banlieue de Lyon, France
 Standard Fireworks Limited, Huddersfield, England
 Standard Railway Fusee Corporation, Boonton, New Jersey
 Stehling and Co., Hamburg, Germany

* A list of authorized fireworks is on file in the office of the Explosives Division. Information may be obtained on request.

EXPLOSIVES DIVISION

Authorized Fireworks—Concluded

Foreign Manufacturers (Certain Fireworks Authorized)—Concluded

The J. & E. Stevens Sales Co., New York, New York
Superior Signal Co. Incorporated, South River, New Jersey
United Fireworks Manufacturing Company, Dayton, Ohio
U.S. Fish and Wildlife Service, Pocatello, Idaho
Van Karner Chemical Arms Corporation, New York, New York
Messrs. Waeco Ltd., High Post, Salisbury, England
Joseph Wells & Sons Limited, Dartford, Kent, England
Joh. Chr. Wendt, Hamburg, Gr. Borstal, Germany
Wischo-K.G. Wilsker Co., Erlangen, West Germany
Wunderkerzen-Werk Carl Flemming, Hamburg-Neugraben, Germany

Chinese firecrackers with gunpowder composition and not exceeding 4 inches in length and 9/16 inch in diameter, and small Chinese fireworks, are authorized when found to function satisfactorily on examination at port of entry.

